

AMENDMENTS TO THE CLAIMS

1. (Currently amended) A photovoltaic device, the device comprising:
a first layer comprising a ~~first~~ semiconductor material comprising a first conductivity type an amorphous silicon semiconductor material of n-type conductivity;
a second layer comprising a ~~second~~ semiconductor material of a second conductivity type, wherein the second conductivity type is opposite the first conductivity type crystalline silicon semiconductor material of p-type conductivity; and
a third layer comprising a non-doped consisting of a single elemental semiconductor material, wherein the third layer is situated between and contacts the first layer and the second layer, and wherein the third layer is a translucent porous layer and diffusion barrier having a thickness of from about 1 nm to about 50 nm; and wherein the third layer is of a homogeneous porosity.

2. (Cancelled)

3. (Original) The photovoltaic device according to claim 1, wherein the photovoltaic device comprises a device selected from the group consisting of a photodiode, a photoresistor, and a solar cell.

4-17. (Cancelled)

18. (Original) The photovoltaic device according to claim 1, wherein the third semiconductor material comprises a crystalline semiconductor material.

19. (Original) The photovoltaic device according to claim 1, wherein the third layer comprises a material selected from the group consisting of a multicrystalline semiconductor material and a monocrystalline semiconductor material.

20. (Currently amended) The photovoltaic device according to claim 1, wherein the second layer comprises a crystalline monocrystalline semiconductor material.

21. (Currently amended) The photovoltaic device according to claim 1, wherein the second layer comprises a ~~material selected from the group consisting of a monocrystalline semiconductor material and a multicrystalline semiconductor material~~.

22. (Previously presented) The photovoltaic device according to claim 1, wherein the first layer has a thickness of from about 3 nm to about 100 nm.

23. (Original) The photovoltaic device according to claim 1, further comprising an amorphous silicon layer, wherein the amorphous silicon layer is situated between the first layer and the third layer.

24. (Original) The photovoltaic device according to claim 1, further comprising a fourth layer, wherein the second layer is attached to the fourth layer, wherein the fourth layer comprises a porous layer comprising a fourth semiconductor material, and wherein the fourth semiconductor material comprises non-doped crystalline silicon semiconductor material.

25. (Original) The photovoltaic device according to claim 24, further comprising a fifth layer, wherein the fourth layer is attached to the fifth layer, wherein the fourth layer and the fifth layer comprise a same conductivity type, and wherein the fifth layer comprises a material selected from the group consisting of amorphous silicon semiconductor material, nanocrystalline semiconductor material, and microcrystalline silicon semiconductor material.

26. (Original) The photovoltaic device according to claim 1, wherein the second layer comprises a plurality of macro etch pits comprising a diameter of greater than about one micron, and wherein a portion of the macro etch pits comprise a plurality of fine etch pits comprising a diameter of less than about one micron.

27-36. (Canceled)

37. (Previously presented) The photovoltaic device according to claim 1, wherein the third layer comprises a porous semiconductor material comprising a semiconductor material and voids, wherein a percentage of a total volume occupied by voids is from 10% to 85%.

38. (Currently amended) The photovoltaic device according to claim 1, wherein the third layer consists of a porous non-doped monocrystalline silicon semiconductor material ~~selected from the group consisting of a monocrystalline silicon semiconductor material and a multi-crystalline silicon semiconductor material~~.

39. (Currently amended) The photovoltaic device according to claim 1, wherein the second layer comprises a multi-crystalline silicon semiconductor material of p-type conductivity, the first layer comprises an amorphous silicon semiconductor material of n-type conductivity, and the third layer consists of a porous non-doped multicrystalline silicon

semiconductor material comprising a multi-crystalline semiconductor situated between the first layer and the second layer.

40. (Previously presented) The photovoltaic device according to claim 1, wherein the third layer consists of a porous layer.

41. (Previously presented) The photovoltaic device according to claim 1, wherein the third layer consists of a translucent layer.

42. (Previously presented) The photovoltaic device according to claim 1, wherein the third layer consists of a porous translucent layer that acts as a diffusion barrier.

43-44. (Canceled)

45. (Previously presented) The photovoltaic device according to claim 1, wherein the third layer comprises a porous layer of high transparency.

46. (Previously presented) The photovoltaic device according to claim 1, wherein the third layer consists of a transparent porous layer.

47. (Previously presented) The photovoltaic device according to claim 1, wherein the third layer consists of silicon.

48. (Previously presented) The photovoltaic device according to claim 1, wherein the third layer consists of germanium.

49. (Previously presented) The photovoltaic device according to claim 1, wherein the third layer consists of carbon.

50. (Previously presented) The photovoltaic device according to claim 1, wherein the third layer is a single translucent porous layer.

51. (New) The photovoltaic device according to claim 1, wherein the third layer consists of a single semiconductor element.

52. (New) The photovoltaic device according to claim 1, wherein the third layer comprises silicon.

53. (New) The photovoltaic device according to claim 1, wherein the third layer comprises germanium.

54. (New) The photovoltaic device according to claim 1, wherein the first layer, the second layer, and the third layer together constitute a heterojunction with intrinsic thin-layer cell.

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55. (New) The photovoltaic device according to claim 1, wherein the first layer consists of an amorphous silicon semiconductor material of n-type conductivity, wherein the second layer consists of a crystalline silicon semiconductor material of p-type conductivity; and wherein the third layer consists of a porous, translucent semiconductor material.

56. (New) The photovoltaic device according to claim 1, wherein the third layer has a porosity of from 15% to 20% and a thickness of from 5 nm to 10 nm as measured by spectroscopic ellipsometry.